



Base from U.S. Geological Survey, 1956
Universal Transverse Mercator projection

Generalized bedrock geologic map compiled by Warren J. Nokleberg from mapping by Warren J. Nokleberg,
Ian M. Lange, John N. Auerbach, Romy T. Myasaka, and Richard E. Zehner, 1977-89

Table 1.--Potential and recognition
criteria for gold placer deposits, Mount
Hayes quadrangle, eastern Alaska Range,
Alaska

(+, number or mineral indicates criterion
present; 0 indicates criterion not observed)

Potential	Recognition criteria present in each area
Area	1 2 3 4
Moderate	1 + gold 0
Moderate	2 + 0 0
Moderate	3 + gold, cin +
Moderate	4 + gold, cin 0
Low	6 0 gold 0
Low	7 0 gold, cin 0
Moderate	9 + gold, cin 0
Moderate	11 + gold 0

- Description of recognition criteria
- Geologically favorable environment consisting of stream gravels or conglomerates in a region containing gold-bearing igneous deposits.
 - Known mine, deposit, prospect, or occurrence.
 - Occurrence of gold and cinnabar in heavy-mineral-concentrate samples.
 - Anomalous values of Au in heavy-mineral-concentrate samples.

Table 2.--Potential and recognition criteria for
platinum-placer deposits, Mount Hayes
quadrangle, eastern Alaska Range, Alaska

(+, number indicates criterion present; 0
indicates criterion not observed)

Potential	Recognition criteria present in each area
Area	1 2
Very low	5 0
Very low	8 0
Very low	10 0

- Description of recognition criteria
- Geologically favorable environment consisting of stream gravels or conglomerates in a region containing cumulate mafic or ultramafic rocks, or alpine peridotites.
 - Known deposit, prospect, or occurrence.

Table 3.--Potential and recognition criteria for
gabbroic Ni-Cu
deposits, Mount Hayes quadrangle, eastern Alaska Range, Alaska

(+, letter, element, or mineral indicates criterion present; 0 indicates
criterion not observed)

Potential	Recognition criteria present in each area
Diagnostic	Secondary
Area	1 2 3 4
Moderate	A + + Cu, Ni, Co Cu, Ni Co Cu, Ni, Co +
Low	B 0 0 Ni, Co Ni 0
Low	C 0 0 0 Cu, Ni 0 +
Low	D + + Cu, Ni, Co Cu, Ni Co +
Low	E 0 0 0 Cu +

- Description of recognition criteria
- Geologically favorable environment of cumulate mafic or ultramafic rock and gabbro or norite dikes and sills intruding or associated with gabbroic belt.
 - Known deposit, prospect, or occurrence.

Table 4.--Potential and recognition criteria for podiform chromite deposits,
Mount Hayes quadrangle, eastern Alaska Range, Alaska

(+, letter, element, or mineral indicates criterion present; 0 indicates criterion
not observed)

Potential	Recognition criteria present in each area
Diagnostic	Secondary
Area	1 2 3 4
Moderate	A + + Cr, Ni, Co Cr, Ni Cr, Ni, Co +
Moderate	B + + Cr, Ni, Co Cr, Ni Cr, Ni +
Moderate	C + 0 Cr, Ni, Co Cr, Ni Ni +
Moderate	D + + Cr, Ni, Co Cr, Ni Co +
Low	F 0 + 0 0 Co +
Low	G 0 0 0 Cr, Ni Ni, Co +
Moderate	H + + Cr, Ni, Co Ni Ni, Co +

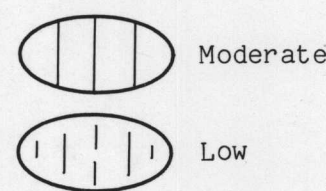
- Description of recognition criteria
- Geologically favorable environment of metamorphic-textured mafic or ultramafic rocks, associated mafic intrusive rocks, or cumulate mafic or ultramafic rocks.
 - Known deposit, prospect, or occurrence.
 - Tectonic emplacement.

- Secondary
- Anomalous values of Cr, Ni, or Co in rock samples.
 - Anomalous values of Cr, Ni, or Co in stream-wediment samples.
 - Anomalous values of Cr, Ni, or Co in heavy-mineral-concentrate samples.
 - Strong aeromagnetic gradient or high.

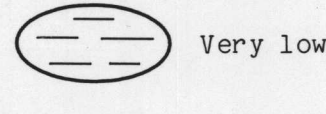
GOLD PLACER AND PLATINUM PLACER DEPOSITS AND GABBROIC NI-CU AND PODIFORM CHROMITE DEPOSITS

EXPLANATION

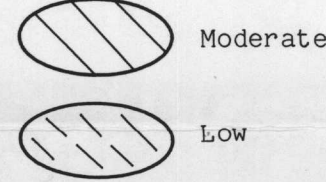
Gold placer deposits--Area of potential for undiscovered. Numbers refer to table 1



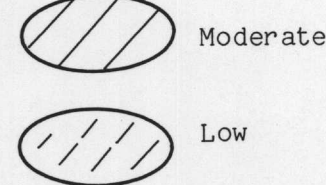
Platinum placer deposits--Area of potential for undiscovered deposits. Numbers refer to table 2



Gabbroic Ni-Cu deposits--Area of potential for undiscovered deposits. Letters refer to table 3



Podiform deposits--Area of potential for undiscovered deposits in ultramafic rocks. Letters refer to table 4



DESCRIPTION OF MAP UNITS

Qs Surficial deposits (Quaternary)--Alluvium, colluvial deposits, glacial deposits, fluvio-lacustrine deposits, rock glacier deposits, snow and ice

gT Granitic plutonic rocks (early Tertiary(?) to Late Jurassic)--Chiefly medium- to coarse-grained biotite-hornblende granite and hornblende-biotite granodiorite, with lesser quartz diorite and diorite and sparse monzonite. From moderate to large plutons and sparse dikes. Locally schistose and recrystallized at lower greenschist facies. Individual plutons generally fault bounded in area south of Denali fault. Local intense base hydrothermal alteration

SEDIMENTARY AND IGNEOUS ROCKS

Tsc Sandstone, conglomerate, and coal (middle or early Tertiary)--Chiefly conglomerate at the base grading upward into interbedded sandstone and coal. Overlain by interbedded lenses of poorly consolidated siltstone, mudstone, and sparse sandstone. Includes locally extensive coal deposits in vicinity of Jarvis Creek

la Lamprophyre and alkalic gabbro (early Tertiary)--Chiefly pseudomorpho-granular aggregates of olivine, clinopyroxene, clinopyroxene, hornblende, biotite, plagioclase, and potassium-feldspar containing various amounts of groundmass, fine-grained hornblende, biotite, plagioclase, and opaque and interstitial or replacement carbonates; local embayed phenocrysts. Occur in small to moderate-size plutons and dikes within Jarvis Creek

m Monzonite and monzonitic (early Tertiary)--Hypomorpho-granular aggregates of clinopyroxene, biotite, potassium-feldspar, plagioclase. Local white mica and carbonaceous alteration. From moderate-size plutons as part of intrusive complex with lamprophyre and alkalic gabbro in north-central part of quadrangle

gG Gabbro and mafic plutonic rocks (Tertiary(?) and Cretaceous)--Gabbro and megacrystic gabbro with lesser diabase, varying from mainly hypomorpho-granular or cryptic aggregates of hornblende, plagioclase and lesser biotite to megacrystic composed of schistose aggregates of actinolite, chlorite, biotite, epidote, and albite. Occur in narrow dikes to small to moderate-size plutons

YUKON-TANANA TERRANE

Lake George subterranean North of Tanana River fault

lga Argonite gneiss and schist (Mesozoic)--Coarse to medium-grained argonite gneiss and schist composed of schistose aggregates of potassium feldspar, plagioclase, biotite, and quartz. Ductily deformed and regionally metamorphosed at amphibolite facies into mylonitic gneiss and schist. Occur in moderate- to large-size irregularly shaped, homogeneous plutons intruding schistose granitic plutons and pelitic schist. Relict hypomorpho-granular texture with relict potassium feldspar phenocrysts. Locally deformed and retrograded to lower greenschist facies

lgr Igneous gneiss and schist (Devonian)--Chiefly gneissose hornblende-biotite granodiorite and quartz diorite. Ductily deformed and regionally metamorphosed at amphibolite facies into mylonitic gneiss. Locally deformed and retrograded to lower greenschist facies

lgs Igneous gneiss and schist (Devonian or older)--Hornblende-biotite quartz-plagioclase schist and hornblende-plagioclase-quartz amphibolite. Derived from gabbro, quartz gabbro, diorite, and quartz diorite. Relict hypomorpho-granular texture. Ductily deformed at middle amphibolite facies into mylonitic schist and gneiss. Local retrograde metamorphism to greenschist facies. Relatively older and more highly metamorphosed equivalent of the gneissic rocks of East Fork of Tanana River

lco Coarse-grained pelitic schist (Devonian or older)--Poly-deformed, coarse-grained pelitic schist composed of quartz, feldspar, and biotite. Ductily deformed and regionally metamorphosed at amphibolite facies into mylonitic schist. Locally deformed and retrograded to lower greenschist facies

lca Fine-grained pelitic schist (Devonian or older)--Poly-deformed, fine-grained pelitic schist composed of quartz, feldspar, and biotite. Ductily deformed and regionally metamorphosed at amphibolite facies into mylonitic schist. Locally deformed and retrograded to lower greenschist facies

lms Metamorphosed pelitic schist (Devonian or older)--Poly-deformed, medium-grained pelitic schist composed of quartz, feldspar, and biotite. Ductily deformed and regionally metamorphosed at amphibolite facies into mylonitic schist. Locally deformed and retrograded to lower greenschist facies

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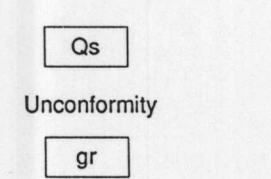
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CORRELATION OF MAP UNITS



SEDIMENTARY AND VOLCANIC ROCKS AND METAMORPHOSED SEDIMENTARY, VOLCANIC, AND PLUTONIC ROCKS South of Denali fault

TERRANE OF ULTRAMAFIC AND ASSOCIATED ROCKS

Splay of Denali fault

MACLAIREN TERRANE

South of Denali fault and north of Bronson Gulch thrust

East Susitna batholith and south of Denali fault and north of Meteor Peak fault

DEVONIAN OR OLDER

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GOLD PLACER AND PLATINUM PLACER DEPOSITS AND GABBROIC NI-CU AND PODIFORM CHROMITE DEPOSITS

METALLIFEROUS MINERAL RESOURCE ASSESSMENT MAPS OF THE MOUNT HAYES QUADRANGLE, EASTERN ALASKA RANGE, ALASKA

By
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